Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Good™

Chikasanoxee Creek at Chambers County Road 53 crossing (33.04570/-85.54117)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Chikasanoxee Creek watershed for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.

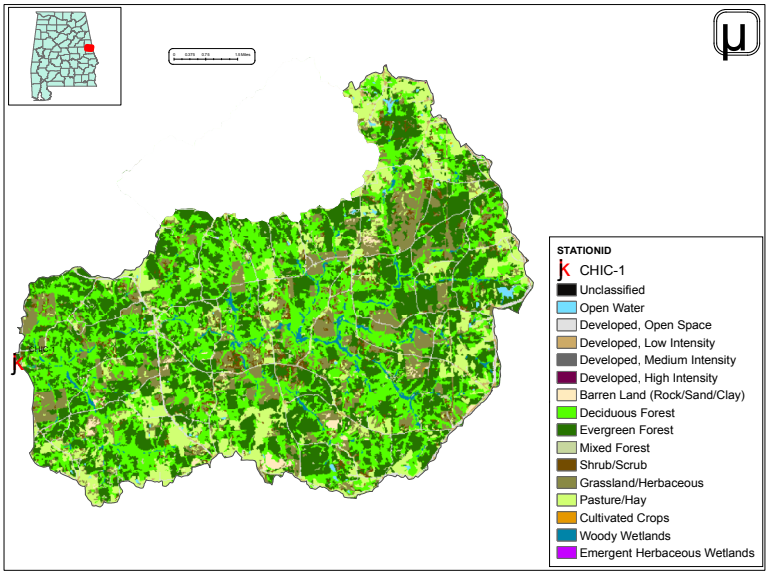

Figure 1. Sampling location and landuse within the Chikasanoxee Creek watershed at CHIC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Chikasanoxee Creek is a small *Fish & Wildlife (F&W)* stream located in the Piedmont Region near the city of Shiloh (Fig. 1). Landuse within the watershed is primarily evergreen (33%) and deciduous (30%) forest. The presence of mixed forests is characteristic of streams in the Southern Outer Piedmont Region. As of June 9, 2008, ADEM's NPDES Management System database did not show any permitted discharges located within the watershed.

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (Table 3) were completed during the macroinvertebrate assessment. In comparison with reference reaches in the same ecoregion, they give an indication of the physical condition of the site and the quality and availability of habitat. Chikasanoxee Creek at CHIC-1 is a medium-gradient, sand-bottomed stream in the Tallapoosa River Basin. Overall habitat quality was categorized as *optimal,* due to bank erosion, sedimentation, and limited riparian buffers.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi^2)		74
Ecoregion[a]		45b
% Landuse		
Open water		<1
Wetland	Woody	2
	Emergent herbaceous	
Forest	Deciduous	30
	Evergreen	33
	Mixed	1
Shrub/scrub		2
Grassland/herbaceous		13
Pasture/hay		13
Cultivated crops		<1
Development	Open space	4
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km^2[b]		9

a.Southern Lower Piedmont
b.2000 US Census Data

Table 2. Physical characteristics at CHIC-1, May 10, 2005.

Physical Characteristics		
Width (ft)		45
Canopy cover		Est. 50/50
Depth (ft)		
	Riffle	1
	Run	2.0
	Pool	2.5
% of Reach		
	Riffle	10
	Run	70
	Pool	20
% Substrate		
	Bedrock	5
	Boulder	15
	Cobble	10
	Gravel	25
	Sand	38
	Silt	3
	Organic Matter	4

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-I uses measures of taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Each metric is scored on a 100 point scale. The final score is an average of the score for each metric. Metric results indicated the macroinvertebrate community to be in *good overall* condition (Table 4).

Table 3. Results of the habitat assessment conducted May 10, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	83	Optimal (> 70)
Sediment deposition	51	Marginal (41-58)
Sinuosity	70	Sub-optimal (65-84)
Bank and vegetative stability	74	Sub-optimal (60-74)
Riparian buffer	78	Sub-optimal (70-90)
Habitat assessment score	178	
% Maximum score	**74**	**Optimal (> 70)**

Table 4. Results of the macroinvertebrate bioassessment conducted May 10, 2005.

Macroinvertebrate Assessment Results			
	Results	**Scores (0-100)**	**Rating**
Taxa richness measures			
# Ephemeroptera (mayfly) genera	14	100	Excellent (>86)
# Plecoptera (stonefly) genera	7	100	Excellent (>86)
# Trichoptera (caddisfly) genera	9	75	Good (72-86)
Taxonomic composition measures			
% Non-insect taxa	6	76	Good (72-86)
% Non-insect organisms	3	93	Excellent (>86)
% Plecoptera	13	66	Fair (48-72)
Tolerance measures			
Beck's community tolerance index	23	82	Good (72-86)
WMB-I Assessment Score	**---**	**85**	**Good (72-86)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2005 to help identify any stressors to the biological communities. The site did not exceed numeric criteria for metals. However, total (aluminum, iron, and manganese) and dissolved (iron and manganese) metals were detected at concentrations higher than expected in this ecoregion. Median values of nitrate+nitrite-nitrogen, and alkalinity were also higher than expected.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *good* condition. However, intensive water quality sampling and habitat assessment results suggested nutrient enrichment, elevated metal concentrations, and sedimentation to be issues of concern within the reach.

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Table 5. Summary of water quality data collected March-October, 2005. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value. Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Median	Avg	SD
Physical						
Temperature (°C)	8	14.0	26.0	21.2	20.8	4.1
Turbidity (NTU)	7	10.5	112.0	16.8	35.7	39.9
Total dissolved solids (mg/L)	6	23.0	73.0	54.0	54.2	18.4
Total suspended solids (mg/L)	6	4.0	58.0	9.0	16.8	20.7
Specific conductance (µmhos)	8	32.3	65.6	52.7	50.4	10.1
Hardness (mg/L)	4	9.1	20.6	16.2	15.5	4.9
Alkalinity (mg/L)	6	12.9	28.9	23.0[M]	22.0	6.2
Stream Flow (cfs)	5	30.4	113.3	70.5	65.5	---
Chemical						
Dissolved oxygen (mg/L)	8	6.9	9.5	8.7	8.4	0.9
pH (su)	8	5.8	7.94	7.3	7.2	0.6
Ammonia Nitrogen (mg/L)	6	< 0.015	0.027	0.008	0.014	0.010
Nitrate+Nitrite Nitrogen (mg/L)	6	0.088	0.161	0.121[M]	0.122	0.031
Total Kjeldahl Nitrogen (mg/L)	6	< 0.150	0.432	0.075	0.174	0.158
Total nitrogen (mg/L)	6	0.103	0.176	0.141	0.141	0.035
Dissolved reactive phosphorus (mg/L)	6	0.004	0.021	0.006	0.008	0.007
Total phosphorus (mg/L)	6	0.014	0.063	0.027	0.031	0.018
CBOD-5 (mg/L)	8	< 1.0	4.7	1.5	2.1	1.4
Chlorides (mg/L)	6	4.2	5.88	4.8	4.8	0.6
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.555	0.089[M]	0.185	0.3
Iron (mg/L)	4	1.19	2.87	1.575[M]	1.803	0.7
Manganese (mg/L)	4	0.095	0.644	0.1605[M]	0.265	0.3
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.18	0.0218	0.058	0.1
Antimony (µg/L)	4	< 2	< 2	1	1	0
Arsenic (µg/L)	4	< 10	< 10	5	5	0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Iron (mg/L)	4	0.265	0.582	0.426[M]	0.425	0.153
Lead (µg/L)	4	< 2	< 2	1	1	0
Manganese (mg/L)	4	0.079	0.15	0.122[M]	0.118	0.037
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.15	0.00
Nickel (mg/L)	4	< 0.006	0.012	0.003	0.005	0.005
Selenium (µg/L)	4	10	10	5	5	0
Silver (mg/L)	4	< 0.003	< 0.003	0.00	0.002	0.000
Thallium (µg/L)	4	< 1	< 1	0.5	0.5	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
[J] Chlorophyll a (mg/L)	6	0.53	8.01	1.60	2.58	2.71
[J] Fecal Coliform (col/100 mL)	6	36	920	90	227	344

J=estimate; N=# samples; M=value > 90th percentile of all verified ecoregional reference data collected within eco-region 45b